Claims

1. (previously presented) A method comprising:

forming a model of multi-dimensional spectroscopic information including at least one set of two or more mutually exclusive terms, the set of terms formed from at least first and second multi-dimensional spectroscopic data sets of a dimension less than the modeled multi-dimensional information, and

selecting only one of the set of mutually exclusive terms to represent the multi-dimensional spectroscopic information by fitting the model to a third multi-dimensional spectroscopic data set.

2. (previously presented) The method of claim 1 wherein the first and second multi-dimensional data sets share a common dimension and the second multi-dimensional data set has at least one dimension orthogonal to a dimension in the first multi-dimensional data set.

3. (previously presented) The method of claim 2 wherein the at least one orthogonal dimension is a frequency dimension and wherein the set of mutually exclusive terms includes frequency and decay rates determined from the first and second multi-dimensional data sets.

4. (original) The method of claim 1 further comprising representing the multi-dimensional information with a model including only the selected term of the set of mutually exclusive terms.

5. (previously presented) The method of claim 1 wherein the set of mutually exclusive terms includes frequency and decay rates determined from the first and second multi-dimensional data sets.

6. (previously presented) The method of claim 5 wherein the first and second multi-dimensional data sets are of dimension one less than a dimension of the third multi-dimensional data set.

7. (previously presented) The method of claim 6 wherein the third multi-dimensional data set is an NMR spectrum.

8. (previously presented) The method of claim 7 wherein the third multi-dimensional data set is a protein NMR spectrum.

9. (previously presented) The method of claim 1 wherein the third multi-dimensional data set is obtained at lower resolution than the first and second multi-dimensional data sets.

10. (previously presented) The method of claim 1 further comprising:

obtaining peak frequencies and associated decay rates from the first and second multi-dimensional data sets,

and

forming the set of mutually exclusive terms with the obtained peak frequencies and associated decay rates.

11. (previously presented) A method of analyzing a physical object comprising:

providing a series of stimuli to the object and determining the response of the object to the series of stimuli,

varying the times between the stimuli in the series to form at least first and second multi-dimensional data sets of the response of the object to the series of stimuli,

forming a model of multi-dimensional information of a dimension higher than a dimension of the first or second multi-dimensional data sets, the model including at least one set of terms where each term in the set represents a potential correlation between features of the first and second multi-dimensional data sets, and

determining which term in the set of terms represents an actual correlation between features of the first and second multi-dimensional data sets by comparing the model to a third multi-dimensional data set.

12. (previously presented) The method of claim 11 wherein the features of the first and second multi-dimensional data sets include frequency and decay rates.

13. (previously presented) The method of claim 11 further comprising representing the multi-dimensional information with a model including the term determined to be representative of the actual correlation of features.

14. (original) The method of claim 11 wherein providing the series of stimuli and varying the times between the stimuli include performing a multi-dimensional NMR analysis of the object.

15. (previously presented) The method of claim 11 wherein the formed model includes a plurality of sets of terms, and the method further comprises selecting one from each of the sets of terms to represent the actual correlation of features in the first and second multi-dimensional data sets.

16. (original) The method of claim 11 wherein the object is a protein.

17. (original) The method of claim 16 wherein the protein is a heteronuclear labeled protein.

18. (currently amended) A device comprising: a computer readable machine ~~media~~ containing programming instructions for a multidimensional interrogation device, the instructions operable to cause the multidimensional interrogation device to:

form a model of multi-dimensional interrogation information including at least one set of terms where each term represents a potential correlation between features of at least first and second multi-dimensional data sets, the first and second multi-dimensional data sets of a dimension less than a dimension of the modeled multi-dimensional interrogation information~~,~~ ~~and~~ for determining ~~determine~~ which term represents an actual correlation between features of

the first and second multi-dimensional data sets by comparing the model to a third multi-dimensional data set.

19. (previously presented) The device of claim 18 wherein the instructions are operable to cause the multidimensional interrogation device to fit the model to the third multi-dimensional data set to determine which term of the at least one set of terms represents the actual correlation between features.

20. (original) The device of claim 19 wherein the features of the first and second data sets include peak frequencies and associated decay rates.

21. (currently amended) The device of claim 18 wherein the computer readable ~~media~~ machine is selected from the group consisting of floppy disks, magnetically encoded hard disks, tapes, cartridges and optical disks.

22. (original) The device of claim 21 wherein the multi-dimensional interrogation device includes a multi-dimensional NMR machine.

23. (previously presented) The device of claim 22 wherein the features of the first and second data multi-dimensional sets include peak frequencies and associated decay rates of multi-dimensional NMR data sets.

24. (currently amended) A method comprising:

forming ~~at least one set~~ a set of mutually exclusive terms from at least first and second multi-dimensional spectroscopic data sets wherein each of the mutually exclusive terms in the set is representative of a potential ~~correlations~~ correlation between features in the first and second multi-dimensional spectroscopic data sets, and

determining which of the ~~set of~~ mutually exclusive terms represents an actual correlation between features of the multi-dimensional spectroscopic data sets by comparing the model to a third multi-dimensional spectroscopic data set having a dimension greater than that of the first and second multidimensional spectroscopic data sets ~~for representing multi-dimensional spectroscopic information~~.

25. (previously presented) The method of claim 24 wherein determining which term represents the actual correlation between features includes fitting the model to the third multi-dimensional spectroscopic data set.

26. (previously presented) The method of claim 24 wherein the features of the first and second multi-dimensional spectroscopic data sets include peak frequencies and associated decay rates.

27. (original) The method of claim 24 wherein the at least first and second multi-dimensional spectroscopic data sets include NMR data sets.

28. (original) The method of claim 27 wherein the NMR data sets are data sets from NMR analysis of biological material.

29. (previously presented) The method of claim 24 wherein the third multi-dimensional spectroscopic data set is obtained at lower resolution than the first and second multi-dimensional spectroscopic data sets.

30. (currently amended) An apparatus comprising: ~~a device carrying logic to:~~ a computer readable machine containing computer-executable instructions for forming ~~form~~ a model of multi-dimensional information wherein the model includes at least one set of terms where each term represents a potential correlation between features in at least first and second multi-dimensional data sets of a dimension less than the modeled information, and

selecting ~~select~~ one of the set of terms for representing the multi-dimensional information by comparing the model to a third multi-dimensional data set.

31. (currently amended) The apparatus of claim 30 wherein the ~~device~~ computer readable machine comprises ~~logic~~ computer-executable instructions configured to determine the features in the first and second multi-dimensional data sets.

32. (currently amended) The apparatus of claim 30 wherein the computer readable machine ~~device is a computer readable memory device~~ is selected from the group consisting of floppy disks, magnetically encoded hard disks, tapes, cartridges and optical disks.

33. (previously presented) A method for determining multi-dimensional information concerning an object, comprising:

forming first and second multi-dimensional data sets representing projections of information concerning an object of a dimension one higher than the first and second data sets;

correlating the first and second multi-dimensional data sets to form a model of the multidimensional information concerning the object, the model including at least one set of terms where each term in the set represents a potential correlation between features in the first and second multi-dimensional data sets; and

determining which of the terms represents an actual correlation of features in the first and second multi-dimensional data sets by comparing the model to a third multi-dimensional data set representing information concerning the object.

34. (previously presented) The method of claim 33 wherein the third multi-dimensional data set is obtained at lower resolution that the first and second multi-dimensional data sets.

35. (previously presented) The method of claim 1 wherein fitting the model to a third multi-dimensional data set includes minimizing an error term quantifying the difference between data from the third multi-dimensional data set and the modeled multi-dimensional spectroscopic information.

36. (original) The method of claim 35 wherein fitting the model includes performing a linear least squares fit.

37. (previously presented) The method of claim 11 wherein the term representing the actual correlation between features of the first and second multi-dimensional data sets is

determined by minimizing a term quantifying the difference between data from the third multi-dimensional data set and corresponding output of the modeled information.

38. (previously presented) A method, comprising:

obtaining a first multi-dimensional spectroscopic data set and a second multi-dimensional spectroscopic data set, wherein the first and second multi-dimensional spectroscopic data sets each have at least a first coordinate and a second coordinate, wherein the first coordinate of the first multi-dimensional spectroscopic data set and the first coordinate of the second multi-dimensional spectroscopic data set are common coordinates, and the second coordinate of the first multi-dimensional spectroscopic data set and the second coordinate of the multi-dimensional spectroscopic second data set are not common coordinates;

identifying a set of two or more mutually exclusive terms based on the first multi-dimensional spectroscopic data set and the second multi-dimensional spectroscopic data set, wherein the mutually exclusive terms are associated with combinations of coordinate values of the second coordinates of the first and second multi-dimensional spectroscopic data sets associated with at least one common coordinate value of the common coordinate;

forming a model of multi-dimensional spectroscopic information, the model having a predetermined dimension greater than that of the first multi-dimensional spectroscopic data set and the second multi-dimensional spectroscopic data set, wherein the model includes the set of two or more mutually exclusive terms;

obtaining a third multidimensional spectroscopic data set having the predetermined dimension;

fitting the model to the third multi-dimensional spectroscopic data set; and

selecting only one of the set of mutually exclusive terms to represent the multi-dimensional spectroscopic data based on the fitting.